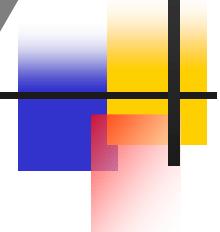


Muon Pioneer Report

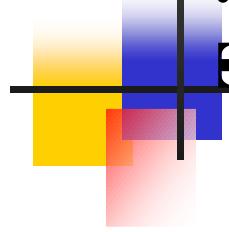


MikeGold, TerukiKamon,
Kaori Maeshima
forExotic μ group

11/07/2001

CDF Exotic Trigger/Dataset/Tool
Meeting

Selected Topics



Triggers and Datasets

- Reconstruction/MC
- *Inclusive μ trigger* → Infuturetalk ...
- $\mu\mu$ trigger
- $\mu+track$ trigger

MUON

(from the CDF Collaboration Meeting in September)

1. Trigger/Datasets for 9/17 - 10/08 (4 pb⁻¹):

Low- P_T $\mu\mu$ (including J/psi $\rightarrow \mu\mu$)
8-GeV μ :CMU6_PT8 $\rightarrow P_T < 12$ and $P_T > 12$
8-GeV $\mu(e) + \text{Track}$: w/o prescale even at high L

2. Offline Reconstruction:

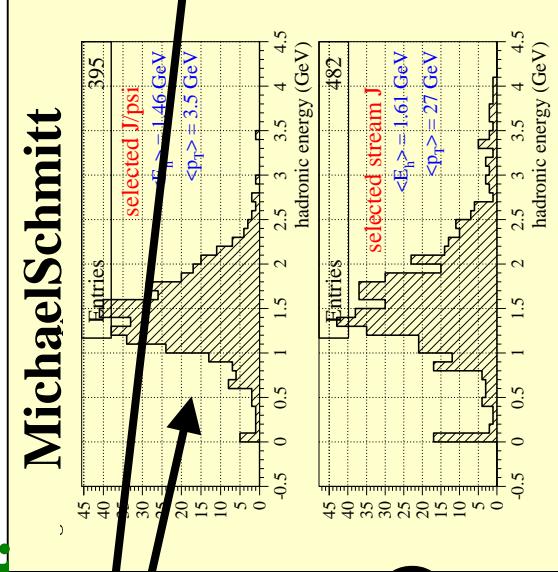
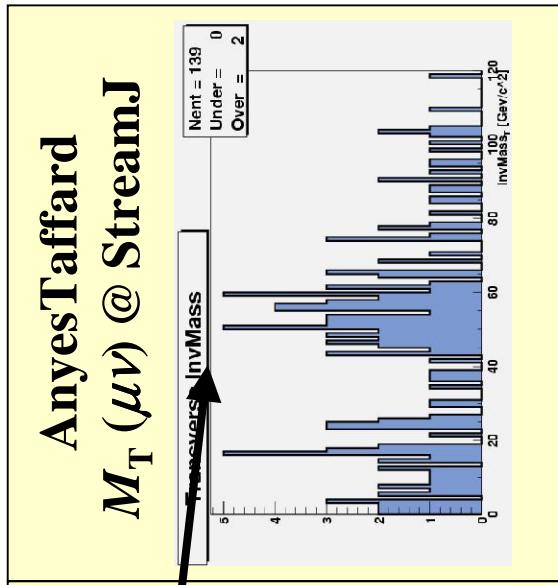
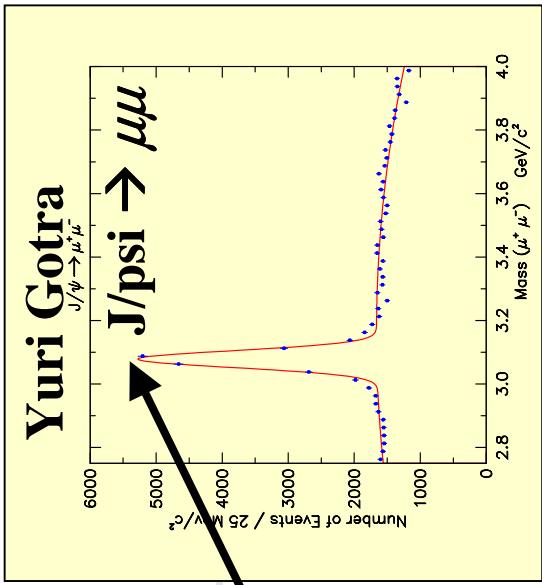
Validation

3. Detector Simulation:

IMU in progress

4. Further Tasks:

Fiducial volume(cdfSim)
trigger/ID efficiencies



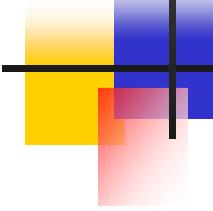
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3

Inclusive Muon Trigger

Muon Reconstruction Group by M.Schmitt and K.Bloom

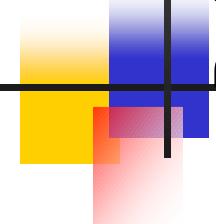


3 baseline samples from
StreamJ for validation:

In progress ... For example,
Eric James made an
excellent start.

- 1.J/psi ($P_T > 12$)
- 2.Low P_T ($P_T < 12$)
We will update this slide in
the future talk..
- 3.High P_T ($P_T > 12$) $\rightarrow W/Z$

Lepton+Track Trigger



Design(CDF -4807,5157):

A. Electron+**Track** (50 nb)

C. Track

- EM>8 GeV, $P_T > 8$ GeV
- Had/EM<0.125
- No isolation cuts

- $P_T > 5$ GeV
- Notracks with $P_T > 1.5$ GeV between 10° and 30°

B. Muon+**Track** (2 nb)

- CMUstub
- $P_T > 8$ GeV
- $\Delta\eta < 10$ cm

Status: The filters are tested and ready. We skimmed the data sample from inclusive μ/e trigger datasets.

Lepton+Track Trigger

Many unrelated tracks!

Stream	Run II	e+track	μ +track	Comments
L1 Trigger	B	CEM8_PT8	CMU6_PT8	
$\sigma(L1\text{-output})$		800 nb	660 nb	
CDF 4807/5157		745 nb	400 nb	at 1.8 TeV
$\sigma(L2\text{-output})$?	?	?	
$\sigma(L3\text{-output})$	40 nb	45 nb	45 nb	
Rate at 10^{31}	0.8 Hz	0.8 Hz	0.8 Hz	
CDF 4807/5157	50 nb	50 nb	1-2 nb	
$N(\text{event})/5\text{pb}^{-1}$	400 k	400 k	400 k	
Event Size	335 kb	335 kb	290 kb	
Disk Space	135 Gb	135 Gb	120 Gb	

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Lepton+Track Trigger



Fall2001 Sample:

- The L3 trigger rate is much higher than what we expect.
- The $\mu/e+track$ datasets are stripped from J/B using the L3 $\mu/e+track$ filter

However:

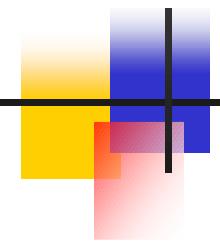
- The muon sample is quite enriched with cosmic ray muons ($\sim 50\%$);
- A large fraction of events passed the cuts because of poorly reconstructed tracks with just a couple of segments (therefore, relatively large P_T)

Status: Working in progress to finalize additional cuts to remove the unwanted background events throughout validation of the `/cdf/data37/a/s0/bottom/prod/strip/dst/* .Dst-Tonfcdfsg12.`

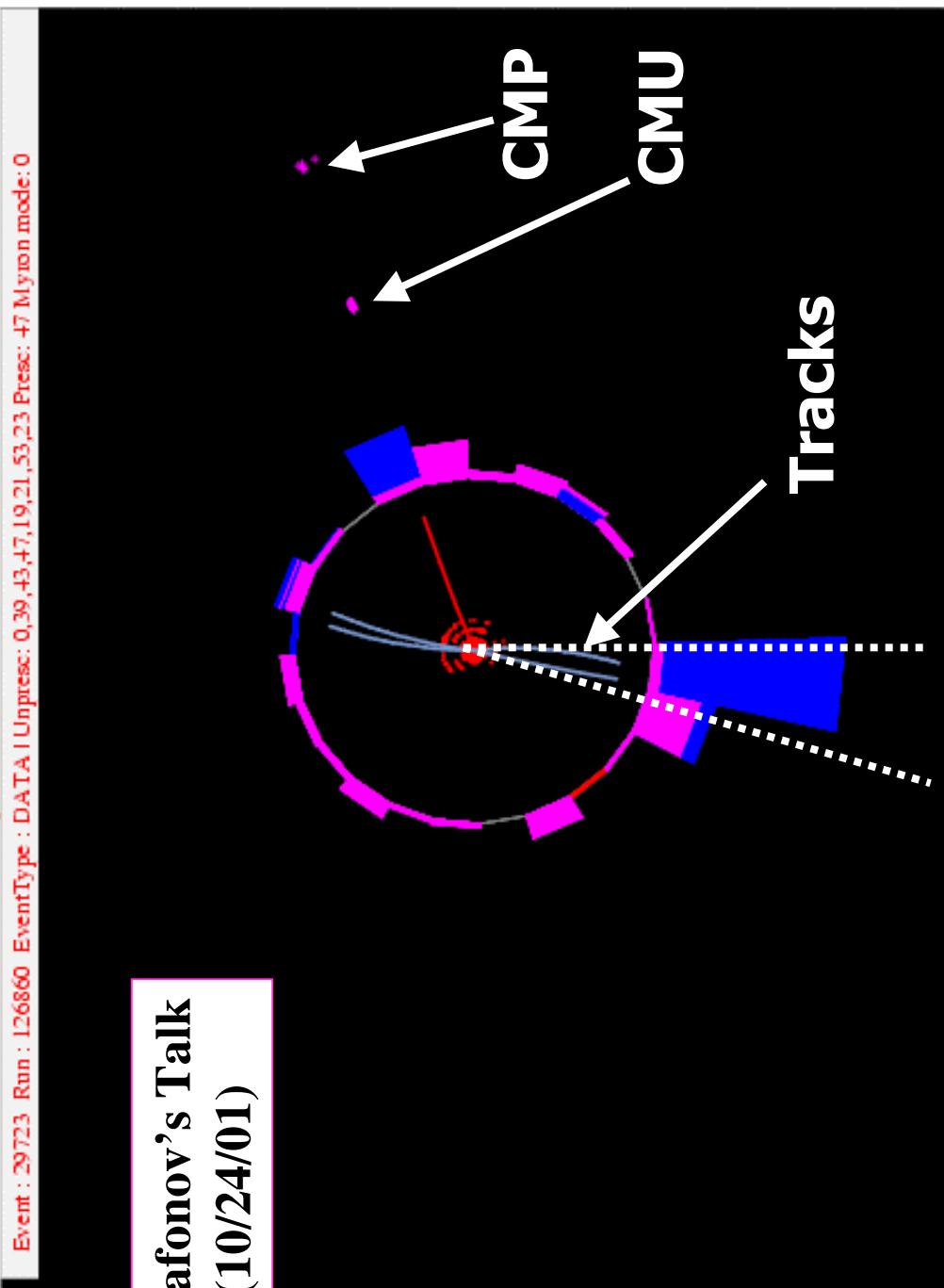
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Events we are looking for:



U+track

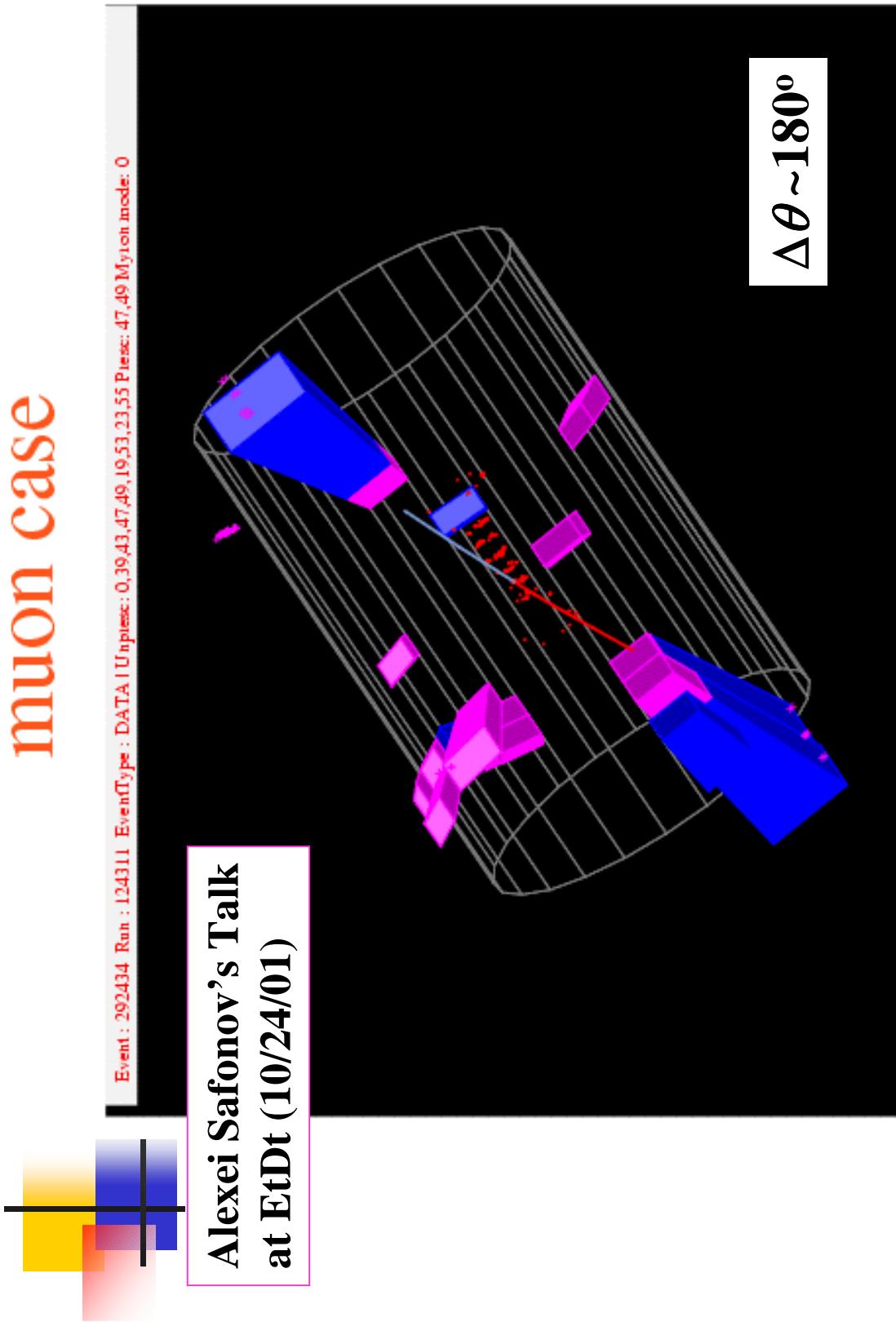


Alexei Safonov's Talk
at EtDt (10/24/01)

11/07/2001

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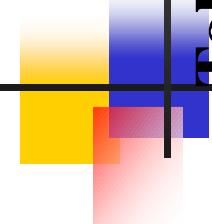
Events we are not looking for: muon case



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Lepton+Track Trigger



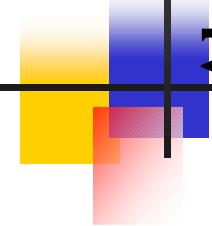
- Takashi Ogawa(Waseda) Cosmic ray muon:
is working on possible cuts
for μ +track dataset for L3:
- μ $N_{hit} \geq 3$ per CMU stub
plus at least one CMP
hit.
 $d_0 < 0.5\text{cm}$
 $|z_\mu - z_{vtx}| < 6\text{cm}$
Trk $|z_{trk} - z_{vtx}| < 6\text{cm}$
 $N_{SL}(N_{hit} \geq 4) \geq 4$
 $d_0 < 0.5\text{cm}$
 - Wereject the event if
'track' is a muon with:
 - a. $P_T(\mu) \sim P_T(\text{trk})$
 - b. $\Delta\theta \sim 180^\circ$

Preliminary Result:

These cuts reduce the size
of the dataset by a factor of
about **five**.

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Meeting

Lepton+Track Trigger



AlexeiSafanov and Stepane

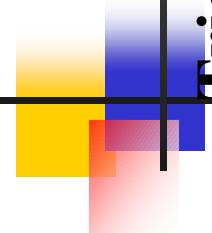
Tourneur (UCDavis)is

workingonpossiblecuts

for $e+$ +trackdatasetforL3:

→ Willbeinafuturetalk.

Summary



- Trigger/datasets:
 - Feedbacks from the fall
 - Physics-oriented plots
(trigger rate, etc.)
- 2001 data samples
- NextC cleanup Study:
 - a) Punch-through particles?
 - b) without Z vtx cut?
 - c) Isolation for muon?
- Note:** We will not impose any isolation on muon if the L3 trigger rate is acceptable.
- See CDF5157